

WHAT IS CLAIMED IS:

1                   1.       An electronic device comprising:  
2                   a first circuit portion; and  
3                   a linear regulator circuit connected to said first circuit portion, said linear  
4 regulator circuit comprising:  
5                   a circuit control node;  
6                   a circuit output node to which a load can be connected, a voltage at  
7 said circuit output node being determined based on a voltage signal at said circuit  
8 control node;  
9                   an amplifier circuit having a first amplifier input and a second  
10 amplifier input, and further having an amplifier output, said first amplifier input  
11 configured for receiving a reference voltage, said amplifier circuit receiving power  
12 from a first voltage source;  
13                   a source follower circuit having a source follower input node and a  
14 source follower output, said amplifier output configured drive said source follower  
15 input node, said source follower output coupled to said circuit control node; and  
16                   a feedback circuit coupled between said circuit output node and said  
17 second amplifier input.

1                   2.       The electronic device of claim 1 wherein said electronic device is a  
2 hard disk device.

1                   3.       The electronic device of claim 2 wherein said first circuit portion is a  
2 hard disk device controller.

1                   4.       The electronic device of claim 1 further comprising a current mirror  
2 circuit coupled between said amplifier output and said source follower.

1                   5.       The electronic device of claim 4 further comprising a resistor  
2 component coupled between a second voltage source and said source follower input node.

1                   6.       The electronic device of claim 5 wherein said first voltage source is  
2 different from the second voltage source.

1                   7.       The electronic device of claim 1 wherein said source follower circuit  
2 comprises a transistor element in series connection with a current source.

1                   8.       The electronic device of claim 1 wherein said amplifier circuit  
2 comprises a single op amp component.

1                   9.       The electronic device of claim 1 wherein said feedback path comprises  
2 a pair of resistor components configured as a voltage divider.

1                   10.      The electronic device of claim 1 wherein a pass element having a  
2 control node can be connected to said circuit control node, wherein an output node of said  
3 pass element can be connected to said circuit output node, whereby said pass element can  
4 provide a regulated output voltage at its output node to a load connected thereto.

1                   11.      The electronic device of claim 10 wherein a second voltage source  
2 different from said first voltage source can be connected to said load via said pass element,  
3 thereby providing a voltage to said load that is independent of said first voltage source.

1                   12.      A hard disk controller circuit comprising:  
2                   a first circuit node;  
3                   a second circuit node, wherein a voltage level thereat varies in accordance  
4 with a voltage level of said first circuit node;  
5                   an error amplifier having a first amplifier input configured to be coupled to a  
6 reference voltage, having a second amplifier input, and having an amplifier output, said error  
7 amplifier configured to receive power from a first voltage source;  
8                   a gain stage comprising a source follower circuit in electrical communication  
9 with said amplifier output and with said first circuit node;  
10                  a feedback path coupled between said second node and said second circuit  
11 amplifier input, said feedback path including a pair of resistors configured as a voltage  
12 divider.

1           13.     The circuit of claim 12 wherein a pass element having a control node  
2     an can be connected to said first circuit node, wherein a output node of said pass element can  
3     be connected to said second circuit node, whereby said pass element can provide a regulated  
4     output voltage at its output node to a load connected thereto.

1           14.     The circuit of claim 13 wherein a second voltage source different from  
2     said first voltage source can be connected to said load via said pass element, thereby  
3     providing a voltage to said load that is independent of said first voltage source.

1           15.     The circuit of claim 12 wherein said gain stage comprises a first  
2     transistor component in series with a current source and having a control terminal, said  
3     amplifier output configured to drive said control terminal.

1           16.     The circuit of claim 15 further comprising a resistor component  
2     coupled between a second voltage source and said control terminal.

1           17.     The circuit of claim 16 wherein said first voltage source and said  
2     second voltage source are the same.

1           18.     The circuit of claim 16 wherein said first voltage source and said  
2     second voltage source are different.

1           19.     In a hard disk drive device, a method for regulating an output voltage  
2     level suitable for supplying power to a first circuit comprising:

3                 detecting said output voltage level;

4                 producing an error signal based on a comparison of said output voltage level  
5     relative to a reference voltage;

6                 controlling a source follower circuit with said error signal to produce a source  
7     follower output; and

8                 varying said output voltage level based on said source follower output,

9                 wherein a bandwidth at said output node has a pole at a frequency greater than  
10     the unity gain frequency of said circuit.

1           20.     The method of claim 19 wherein said first circuit is a hard disk  
2     controller.

1                   21.     The method of claim 19 further comprising setting a DC operating  
2 point of said source follower circuit via a resistor element coupled to a first voltage source.

1                   22.     The method of claim 21 further comprising controlling a pass circuit  
2 with said source follower output to produce said output voltage level.

1                   23.     The method of claim 22 wherein controlling said pass circuit with  
2 includes applying said source follower output to a control node of said pass circuit, said pass  
3 circuit being powered by a second voltage source, wherein a pole at said control node of said  
4 pass circuit varies with a pole at said circuit output node.

1                   24.     The method of claim 23 wherein said first voltage level is different  
2 from said second voltage level.

1                   25.     A hard disk drive device having a hard disk controller, said hard disk  
2 controller including a voltage regulator circuit comprising:

3                         first means for detecting said output voltage level;

4                         second means for producing an error signal based on a comparison of said  
5 output voltage level relative to a reference voltage, said second means couple to a first  
6 voltage source; and

7                         a source follower circuit in electrical communication with said first means to  
8 produce a source follower output,

9                         wherein said output voltage level is varied in response to variances in said  
10 source follower output,

11                         wherein a bandwidth at said output node has a pole at a frequency greater than  
12 the unity gain frequency of said circuit.

1                   26.     The circuit of claim 25 wherein said source follower output can be  
2 connected to a pass element that is connected to a second voltage source, wherein an output  
3 of said pass element constitutes said output voltage.

1                   27.     The circuit of claim 25 further comprising a resistor component  
2 connected between said first voltage source and said source follower circuit.